

Mobile Crane

Weigh Measurement Procedure

1. Introduction

The Special Purpose Vehicle Crane Certification Program allows a certifier nominated by a manufacturer to make a self-declaration about the weight of a new rigid crane. A Mobile Crane Application form is completed for the purpose of obtaining a National Heavy Vehicle Regulator (NHVR) vehicle standard exemption and a Roads and Maritime Services (RMS) Certificate of Approved Operation.

The process of weighing can be complicated, and procedures identified here must be followed to assess a vehicle's mass. The application of these procedures provides certainty for the assessment of mass and takes into account potential variations between different types of portable scales and those conducted at weighbridges for axle groups or gross mass. These variations can result from:

- Variations introduced by the weighing site/ method.
- Environmental factors.
- Vehicle suspension effects.

2. Allowable Mass Limits

Permitted masses are determined by the RMS using tyre section width, tyre capacity, ground contact width and axle spacing information and manufacturers rating information.

Legislation requires that, unless an exemption or other permit is in force, no vehicle or combination can exceed the **lesser** of:

- the GVM, ATM and/ or GCM; or
- the statutory axle and vehicle mass limits; or
- the mass limit applicable to the vehicle's registration configuration code; or
- the sum of the masses allowed on the individual axle or axle groups for a particular vehicle or combination of vehicles, and is determined by the use of the Bridge Formula.
- any limit relating to components – components (e.g. tyre size and ply rating) and the source of information, (usually the tyre and rim placard), can identify a lower mass limit to that of the statutory axle mass. Other components may limit the towing capacity of the vehicle e.g. tow bar coupling.

Reasons for these limits include:

- Pavement protection (mass limits on axles and axle groups).
- Bridge protection (gross mass limit determined)
- Safety (a gross limit determined by the registering authority or manufacturer on the basis of vehicle ability).

3. Vehicle Types Covered

This document is limited to the weighing of new rigid mobile cranes. The operating mass determines under what requirement the vehicle may operate, i.e. which notice or if an access permit will apply.

4. Tare Mass and Equipment Carried

Weighing is normally undertaken using portable scales or a multiple deck weighbridge so that individual axle masses can be determined.

All weighing equipment must be certified for commercial weighing purposes.

The crane must be weighed in operational configuration, i.e. the configuration proposed for on road use with essential equipment for operation. This is referred to as tare mass for mobile cranes.

Fuel tanks and hydraulic fluid tanks must be full at the time of weighing.

The following equipment may be used for the operation of cranes: fly jib, extra lifting block, timbers for outriggers, chains and tackle, some counterweights.

Note - If when weighed, the vehicle exceeds allowable load limits, the manufacturer may need to remove equipment or make modifications, before the vehicle is accepted for on road use.

5. Qualifications

To undertake a weighing the following qualifications are required.

- Training in conducting of mobile crane weighing.
- Training in the use of portable weighing devices (if using such devices).

Other desirable knowledge for nominated certifiers are:

- Basic training in recognition of mechanical components, such as load sharing suspensions.
- Knowledge of dimension and mass limits applicable to mobile cranes.
- Training and understanding of Workplace Health and Safety practices.

6. Certification of the Weighing Devices

On 1 July 2010, a national system of trade measurement administered by the Commonwealth came into effect. From that date, the regulation of trade measurement in NSW became the responsibility of the National Measurement Institute (NMI). The Institute requires that all weighing devices are verified prior to the start of operation.

Under section 18GA of the National Measurement Act 1960, a weighbridge used for trade must be verified before starting operation. There is an obligation on the operator to ensure that a weighbridge used for trade is measuring accurately at all times. The Roads Act (Section 261) states that a certificate of verification can be taken as evidence that the weighbridge has been measuring accurately within the 12 months after that date.

Therefore, to ensure the accuracy of a weighbridge measurement, it should be re-verified every 12 months. A certificate of verification should be available on request from a weighbridge operator. The accuracy of portable scales should also be verified.

7. Arrangements prior to Weighing

Arrangements should be made to conduct a weighing of the vehicle, with attention to the following:

- The site must be suitable for weighing the vehicle.
- The vehicle must be in the condition proposed for on road use, with all fuel, oil and essential water tanks filled.
- Assistance should be available to remove or relocate equipment should that be necessary.
- Copies of applicable manufacturers rating information, dimension data, and modification data are available.

8. Before Weighing

- Determine that the vehicle is in operational configuration, with essential equipment on the vehicle (e.g. fly jib, extra lifting block, timbers for outriggers, chains and tackle, some counterweights).
- Suspension components need to be working freely to ensure vehicle suspension load shares effectively. This can be achieved by driving the vehicle an adequate distance to free up the suspension immediately prior to the actual weighing. (Hydraulic suspensions need to be 'worked' before weighing by being driven over a series of timbers or similar.)
- Ensure that the weighing equipment is functional (batteries charged, scales connected as necessary) and is within acceptable calibration requirements as specified by the manufacturer.

9. Measuring Mass on Weighbridges

Variations in mass may occur dependent on whether all axles are weighted together or are weighed in more than one motion e.g. rear tri axle group off weighbridge when weighing the steer axle.

The following procedure is appropriate for measuring mass on a weighbridge:

- Check that the weighbridge is correctly zeroed before a vehicle moves onto the weighing platform.
- Instruct the driver to drive forward slowly and smoothly until the vehicle or axle groups are positioned on the weighbridge plates. Sudden acceleration or braking while moving onto the plates can cause inaccurate readings.
- Ensure that the vehicle is stationary and the tyres are not touching the sides of the weighbridge. As far as practicable, axles being weighed should be centrally located on the weighing platform.
- Axle groups (tandems and tri-axles etc) must be weighed as units.
- Generally axles or groups should not be weighed more than once. Different readings are likely to occur due to changes in forces when a vehicle is moved.
- Note the weighbridge reading(s). In the case of analog displays this should be the nearest gradation below the needle.
- Under normal conditions end on end weighing may be necessary. In this case ensure only the axle groups being weighed are on the platform and that the other axle groups are clear of the platform.
- The procedure is repeated until all axle groups have been weighed. Each movement forward is one weighing step.

- Reports must clearly indicate how a gross weight is determined – by addition, by direct gross weighing, or by a combination of both.

If the weighbridge is capable of weighing the whole vehicle in one step but does not give separate measurements for each axle group (e.g. a single long platform is used) then it may be necessary to also measure single axles or axle group masses, in the same manner as an end on end weighing.

10. Measuring Mass on Portable Scales

10.1 Using Portable Scales

- Do not use on soft surfaces.
- Do not use on a surface where there is any irregularity exceeding 10mm under the scale.
- Prior to use brush away any loose stones etc. Do not use where the surface is embedded with large stones.
- Do not use for metal or solid rubber tyres, or to weigh anything other than pneumatic tyres – the hydraulics may be damaged.
- The scales should be carried in vehicles correctly, be fully restrained, and be interleaved with suitable material where necessary to reduce rattle and vibration in transit.
- NEVER drop or jar the scale.

The actual weighing should be performed under the following conditions

- Choose a level site for placement of scales, as any slope will affect the weighing – note that some sites have unacceptable slopes leading up to or away from the site, and an accurate mass may not be obtained.
- Use approved procedures from manufacturer's manuals for using scales.
- Determine that the vehicle to be weighed does not exceed the capacity of the scales used.
- Identify any interconnection of the suspension hydraulics, to determine which axles form part of a load sharing axle group and suspension (applicable to multi-axle cranes).
- Scales must be reset to zero, positioning of wheels and recorded weights should be checked by certifiers.
- All axles in a group must be weighed simultaneously unless the number of scales available is insufficient i.e. quad axle groups. Whenever a split weigh of an axle group is undertaken this information is to be highlighted in the report.
- All axles within an axle group should be elevated by the scales all up or by using blocks; except for:
 - Some special vehicles have too many axles to be accommodated on scales and blocks. Try to weigh all axles in a group simultaneously and record weighing/ blocking method. In all instances where it is not possible to weigh each axle in an axle group at the same time an accurate description of the method must be recorded.
- In all cases, scales will remain in the one general area, normally a 5 metre area, the vehicle will be moved throughout the weighing process and may, in some instances, move almost the entire length of the vehicle throughout the weighing process.
- Place scales in front of axles, to weigh all axles together where possible, or place levelling blocks under other axle groups to ensure the vehicle is level when weighed.

- All axles in a group or interconnected by load sharing suspension are to be weighed together.
- The vehicle is to be driven slowly forward on to the scales and levelling blocks, ensuring the tyres are centrally placed on the scale platform and not contacting the frames or the ground.
- When a vehicle overruns the scales, the vehicle is not to be backed up on to the scales as inaccurate readings will result. Replace scales and blocks in front of the axles and repeat.
- In general all brakes are to be released when weighing, with the exception being vehicles fitted with hydraulic suspensions, for example all terrain cranes. On these vehicles the parking brake must be applied to activate the suspension self-levelling system and the engine should be left running to provide oil flow to the suspension.

Safety during weighing is paramount and your workplace health and safety procedures should be followed.

All safety precautions are to be taken to ensure that the vehicle does not inadvertently move.

Small wooden chocks placed each side of diagonally opposite wheels should stop the vehicle rolling during weighing.

- Record the scale readings on the Mobile Crane Application.

11. Recording Vehicle Details

11.1 Mobile Crane Application

The completed Mobile Crane Application is used for calculation of allowable operating masses for granting a vehicle standards exemption by the NHVR and RMS issuing a Certificate of Authorised Operations. It is essential that the Mobile Crane Application is completed correctly.

Complete details are required on any special issues that would affect the determination of appropriate masses or the operation on-road. Details include an itemised list of equipment that is on the vehicle such as lifting chains, bell weights, slings, timbers etc.

12. Documentation

12.1 Mobile Crane Application

Completed Mobile Crane Applications are to be forwarded to the NHVR at vehiclestandards@nhvr.gov.au for the verification of the *In-Principle Support* application.

12.2 Other Documents

The following documentations are required:

- A copy of any Weighbridge Ticket must be provided with the Mobile Crane Applications.
- Photographs of the crane in final configuration.